

REMARKS

General Remarks

Claim 11 has been amended. Claim 15 and 16 have been added. Claims 1-16 are all the claims pending in the application. Applicant thanks the Examiner for acknowledging and accepting the drawings filed on October 17, 2003. Applicant thanks the Examiner for acknowledging the claim to priority under 35 U.S.C. § 119.

Allowable Subject Matter

Applicant acknowledges that claim 14 contains allowable subject matter for at least the reasons cited by the Examiner.

Claim objection

The Examiner objected to claim 11 for lack of antecedent basis for the language “a second detector.” Applicant has amended claim 11 as suggested by the Examiner. Therefore, Applicant requests the Examiner to remove the objection.

Claim rejections -- 35 U.S.C. § 103 (Yoshimura in view of Ishikawa)

The Examiner rejected claims 1, 2, 5, 8, and 9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,439,684 to Yoshimura, et al. (“Yoshimura”) in view of U.S. Patent No. 4,520,367 to Ishikawa, et al. (“Ishikawa”).

As an initial matter, a person skilled in the art would have had no motivation to combine the Yoshimura and Ishikawa references. Yoshimura concerns a method of adjusting record

displacement of a serial printer by forming a plurality of line test patterns spaced apart on a record sheet, and then calculating the amount of displacement and adjusting the feeding amount of the record sheet accordingly. Yoshimura seeks to solve record sheet displacement problems caused by 1) different roller diameters and 2) timing of the recording head in addition to the increased cost and complexity normally incurred in addressing recording sheet displacement. In other words, Yoshimura concerns the calibration of an ink jet recording sheet feeding mechanism.

In contrast, Ishikawa is concerned with developing a better support mechanism for securely mounting a printer head on a carriage. Ishikawa addresses problems caused by the use of a mechanical collar and the placement of a charging electrode in existing heads that results in difficulty of head disassembly and replacement, decreased mounting accuracy of the whole head, and difficulty in holding the head in a predetermined position. Ishikawa is thus concerned, not with calibrating a sheet feeding mechanism, but with improving the design of a mechanical holder for a print head.

Ishikawa, as prior art, is non-analogous to the subject matter of the claims. As the Examiner will appreciate, a person faced with the problem of calibrating the feed amount that a roller feeds a roll of paper into a printer would not turn to Ishikawa for a solution. Such a person would have had no reasonable expectation of finding any kind of solution to these problems in the field in which the Ishikawa reference resides.

Because the Ishikawa reference is non-analogous art, it cannot be validly combined in a rejection under 35 U.S.C. § 103. For this reason alone, the rejection under section 103 is invalid, and should be withdrawn.

Even if Yoshimura and Ishikawa could be combined, Applicant respectfully traverses this rejection. With respect to independent claim 1, the following limitation is present:

wherein dots for correcting a feed amount by which said feed mechanism feeds said medium to be printed are formed on said medium to be printed by ejecting ink from a predetermined print head, among said plurality of print heads.

In making this rejection, the Examiner suggests that the language “from a predetermined print head, among said plurality of print heads” is met by Yoshimura by the teachings at col. 13, lines 64-65. At col. 13, lines 64-65, Yoshimura teaches the following:

In this case, when the carriage moves once, the specific nozzles of recording head 8a are used to emit ink at a determined time interval, that is, for every 10 μ sec, for example.

Yoshimura, in this passage, teaches that ink is emitted from specific nozzles of one recording head. Yoshimura, thus, does not teach using a predetermined print head chosen from a plurality of print heads. Even taking col. 13, lines 64-65 in its larger context, Yoshimura still does not teach the use of a predetermined print head. Over cols. 13 and 14, Yoshimura describes a plurality of recording heads corresponding to different colors, yellow, magenta, cyan, and black, etc. Yoshimura then describes the process for calibrating two test heads as an example. A first print head 8a records a first test pattern P1 (col. 13, lines 66-67). Then, adjacent recording

head 8b records a second test pattern P2, using a similar recording position but a smaller timing interval as that used in the first test pattern (col. 14, lines 9-18). The test patterns are then used to adjust the timing delay between the heads (col. 14, lines 34-45). Finally, Yoshimura teaches that the timing delays between additional heads 8c and 8d may be adjusted using another first and second test pattern, and so on (col. 14, lines 49-51). In this way, Yoshimura teaches calibrating timing delay between and among all of the print heads. The Examiner will appreciate that calibrating timing delays between only *some* of the print heads would not make sense, as the other print heads would remain uncalibrated and therefore print in error. Thus, Yoshimura uses all of the plurality of heads, and fails to show or suggest “a predetermined print head” among a plurality of print heads, as required by the limitation of claim 1.

As discussed above, Ishikawa relates to a more stable mechanism for supporting a print head. Ishikawa does not address calibration at all, and thus Ishikawa also fails to teach or suggest the limitation of producing dots “from a predetermined print head, among a plurality of print heads”.

Therefore, neither Yoshimura nor Ishikawa teaches or suggests the limitation of producing calibration dots “from a predetermined print head, among a plurality of print heads”. Even taking together for what they would have meant as a whole to the person of ordinary skill, Applicant finds in the combined teachings no suggestion that could reasonably be interpreted as teaching the above identified requirement of independent claim 1. The person of ordinary skill would not have (and could not have) combined Yoshimura and Ishikawa in the manner suggested by the Examiner to achieve the subject matter of independent claim 1. Further,

untaught modifications would have been necessary. Applicant therefore respectfully requests the Examiner to withdraw this rejection of independent claim 1 and the respective dependent claims.

Claim rejections -- 35 U.S.C. § 103 (Yoshimura in view of Ishikawa in further view of McLean and Nelson)

The Examiner rejected claims 3 and 4 under 35 U.S.C. § 103(a) as being unpatentable over Yoshimura in view of Ishikawa in further view of McLean and Nelson.

Claims 3 and 4 depend on independent claim 1, which already has been shown to patentably distinguish and to be non-obvious over the Yoshimura and Ishikawa combination. As noted above, neither Yoshimura nor Ishikawa, nor any conceivable combination of Yoshimura and Ishikawa teaches or suggests the limitation of producing calibration dots “from a predetermined print head, among a plurality of print heads”, which is a requirement of independent claim 1, and thus of those claims depending on it.

Moreover, McLean and Nelson also do not teach or suggest the limitation. McLean and Nelson merely show an equation for angular momentum of a mass. McLean and Nelson thus do not compensate for the already mentioned deficiencies of Yoshimura and Ishikawa vis-à-vis claim 1.

Therefore, not one of the three applied references teaches or suggests producing dots from a predetermined print head, among a plurality of print heads, as required in independent claim 1. Even taken together, for what they would have meant as a whole to the person of ordinary skill, Applicant finds in the combined disclosures no teaching or suggestion that could

reasonably be interpreted as meeting the above-identified requirement of independent claim 1.

Applicant therefore respectfully requests the Examiner to withdraw this rejection of claims 3 and 4, both of which depend from independent claim 1.

Claim rejections -- 35 U.S.C. § 103 (Yoshimura in view of Ishikawa in further view of Worthington)

The Examiner rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Yoshimura in view of Ishikawa in further view of U.S. Patent No. 6,467,867 to Worthington, et al. (“Worthington”). Independent claim 1, as explained above, patentably distinguishes over the combined teachings of Yoshimura and Ishikawa.

Worthington does not compensate for the deficiencies of the Yoshimura/Ishikawa combination. As with Yoshimura, Worthington addresses problems with calibrating ink jet print heads. Worthington employs an optical sensor to sense calibration dot patterns generated by various nozzles on the print heads. From these optical pictures, Worthington then calculates a timing and trajectory control sequence which is relayed to the print heads to correct for misalignment and manufacturing tolerance errors. Worthington does not, however, show the use of a predetermined print head, among a plurality of heads. Worthington instead shows printing head-to-head registration patterns with reference to a single print head. The heads are then calibrated to this single reference print head. In other words, all print heads must be used in the calibration. To calibrate using only a predetermined print head would make no sense in Worthington’s scheme, and would render Worthington’s process unworkable. Thus,

Worthington does not show, teach or describe the claimed limitation of producing calibration dots “from a predetermined print head, among a plurality of print heads”.

Because Worthington does not compensate for the already identified deficiencies of the Yoshimura/Ishikawa combination, Applicant respectfully submits that the combined teachings of these three references, taken in any combination, fail to teach or suggest the subject matter of even independent claim 1, much less the subject matter of dependent claim 7. Applicant therefore respectfully requests the Examiner to withdraw this rejection of claim 7.

Claim rejections -- 35 U.S.C. § 103 (Yoshimura in view of Ishikawa in further view of Tomohiro)

The Examiner rejected claims 10 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Yoshimura in view of Ishikawa in further view of JP 2000326554 A to Tomohiro (“Tomohiro”). Independent claim 1, as explained above, patently distinguishes over the combined teachings of Yoshimura and Ishikawa.

Tomohiro does not compensate for the deficiencies of the Yoshimura/Ishikawa combination. Tomohiro shows a method whereby pixel variation with respect to a recording element array is corrected. Tomohiro senses when a new recording medium is present. Thereafter, Tomohiro reads a visible image of a test pattern, generates a correction value, and adjusts the print heads accordingly. Tomohiro does not show producing calibration dots from a “predetermined print head” among a plurality of print heads.

Because Tomohiro does not compensate for the already identified deficiencies of the Yoshimura/Ishikawa combination, Applicant respectfully submits that the combined teachings of these three references, taken in any combination, fail to teach or suggest the subject matter of even independent claim 1, much less the subject matter of dependent claims 10 and 11. Applicant therefore respectfully requests the Examiner to withdraw this rejection of claims 10 and 11.

Claim rejections -- 35 U.S.C. § 103 (Yoshimura in view of Ishikawa in further view of Yamasaki)

The Examiner rejected claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Yoshimura in view of Ishikawa in further view of U.S. Patent No. 6,769,759 to Yamasaki, et al. (“Yamasaki”). Independent claim 1, as explained above, patently distinguishes over the combined teachings of Yoshimura and Ishikawa.

Yamasaki does not compensate for the deficiencies of the Yoshimura/Ishikawa combination. Yamasaki is concerned with providing a technique to improve image quality to selecting adequate papers feedings in a printer. Yakasaki prints a test pattern, including a plurality of color patches printed using different values, and then determines correction values for the feed amount by investigating the printing results of the test patterns. More specifically, Yakasaki is concerned with interlaced recording modes in which only a print head having nozzles aligned in a row at a nozzle pitch that is twice the dot pitch in the sub-scan direction. Yakasak shows a printer system having only one print head. Yakasaki does not show, teach, or

disclose producing calibration dots from a “predetermined print head” among a plurality of print heads.

Because Yamasaki does not compensate for the already identified deficiencies of the Yoshimura/Ishikawa combination, Applicant respectfully submits that the combined teachings of these three references, taken in any combination, fail to teach or suggest the subject matter of even independent claim 1, much less the subject matter of dependent claim 12. Applicant therefore respectfully requests the Examiner to withdraw this rejection of claim 12.

Claim rejections -- 35 U.S.C. § 103 (Yoshimura in view of Ishikawa in further view of Ogasawara)

The Examiner rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Yoshimura in view of Ishikawa in further view of U.S. Patent No. 6,116,795 to Ogasawara. (“Ogasawara”). Independent claim 1, as explained above, patentably distinguishes over the combined teachings of Yoshimura and Ishikawa.

Ogasawara does not compensate for the deficiencies of the Yoshimura/Ishikawa combination. Ogasawara is concerned with maintaining the precision of a line feeding amount of a paper sheet despite processing precision of paper feed rollers. Specifically, Ogasawara is drawn to calculating correction values for correcting feed motor step counts and then using those correction values to adjust a paper feed motor in a line feeding operation. Ogasawara is not directed at print heads or print head calibration. As such, Ogasawara does not show the claimed

limitation of producing calibration dots from a “predetermined print head” among a plurality of print heads.

Because Ogasawara does not compensate for the already identified deficiencies of the Yoshimura/Ishikawa combination, Applicant respectfully submits that the combined teachings of these three references, taken in any combination, fail to teach or suggest the subject matter of even independent claim 1, much less the subject matter of dependent claim 13. Applicant therefore respectfully requests the Examiner to withdraw this rejection of claim 13.

New claims

Claims 15 and 16 have been added to more fully claim features of the invention. No new matter has been added, and the claim is fully supported in the specification.

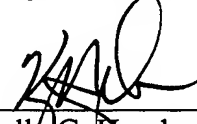
With respect to claim 16, Yoshikawa teaches that each of the plurality of print heads has *one of* a black nozzle row, a cyan nozzle row, a magenta nozzle row, and a yellow nozzle row. (col. 13, lines 38-43). Thus, Yoshikawa does not teach the feature recited in claim 16.

Conclusion and request for interview

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

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23373

CUSTOMER NUMBER

Date: December 1, 2005